Clinical Guidelines: Indications for MRI

INTRODUCTION

In most cases, referral of the patient to the orthopedist is more cost-effective than ordering an MRI scan prior to the referral. The orthopedic surgeon may not need an MRI for the diagnosis or may feel the need for alternative studies. Of course, those decisions would be made with cost effectiveness in mind. If there is any doubt on the primary care physician's part as to whether an MRI or other diagnostic study is needed or whether a referral is needed, a quick telephone call to the orthopedist may be the best way of resolving that issue.

LUMBAR SPINE

Indications for MRI of the lumbar spine:

1. MRI is indicated emergently for cauda equine syndrome, i.e. bowel/bladder compromise and or saddle anesthesia.
2. Systemic symptoms associated with severe low back pain, i.e. fevers, chills, malaise, weight loss and pain at rest.
3. Sciatica associated with progressive neurological deficit.
4. Severe Sciatica with radiation of pain below the knees, not responsive to bed rest, NSAIDS, analgesics, and physical therapy over a six week period.
5. Severe sciatica causing excruciating pain down the lower extremity below the knee that is not improved with 5-7 days of bed rest.
6. Long history of low back pain not responsive to prolonged conservative care.
7. Symptoms of spinal claudication that have not responded to conservative care. Alternative study would be CT Myelogram.

THORACIC SPINE

An MRI is useful in the following conditions:

1. Spine Infection and Tumor: A patient with severe localized thoracic midline pain associated with fevers, chills, night sweats, weight loss, pain worse at night, and a physical exam that shows localized tenderness. The MRI is useful to rule-out vertebral osteomyelitis, an epidural abscess, or paraspinal abscess, or a disc space infection. It shows the marrow changes in the vertebral bodies as well as the destruction of the end plates and the confluence of the disc space seen in vertebral osteomyelitis as well as the soft tissue changes and abscesses.
2. Myelopathy: A patient with myelopathy in the lower extremities but not in the upper extremities with associated thoracic pain. The MRI would help rule-out a space-occupying lesion causing spinal stenosis such as a herniated nucleus pulposus or a tumor, either primary or metastatic. A herniated nucleus pulposus will also cause radicular type pain along the intercostal nerve distribution.
3. Intrinsic Spinal Cord Abnormalities: Spinal cord abnormalities can be detected readily with the MRI. A syringomyelia, myelomalacia, as well as spinal cord tumors can be readily detected with the MRI.

The MRI is not used very often to delineate pathology in the thoracic spine. As has been shown in the lumbar spine, the MRI can show abnormalities in asymptomatic individuals. A recent study showed abnormalities can be seen in asymptomatic individuals on thoracic MRIs greater than 70% of the time.

Plain x-rays should always precede an MRI because the can provide substantial information prior to getting the MRI.

CERVICAL SPINE

The MRI can be helpful in determining the following diagnoses:

1. Herniated nucleus pulposus
2. Cervical spine stenosis with or without spinal cord compression
3. Metastatic and primary cancers
4. Vertebral osteomyelitis with or without paraspinal and epidural abscesses
5. Postoperative scarring with stenosis
6. Spinal cord abnormalities such as myelomalacia, spinal cord contusion, spinal cord tumors, or syringomyelia.

The MRI is useful in cervical spine disorders when there is a patient complaint of upper extremity radicular symptoms with weakness, radicular pain from nerve root compression, myleopathy affecting the upper and lower extremities with gait disturbances and balance problems from spinal cord compression; and for a complaint of severe neck pain associated with a neurologic deficit. In addition, other indications may be determined based on the results of a plain x-ray, which should always be done before the MRI.

A plain x-ray will show evidence of infection with disc space narrowing or destruction of the vertebral bodies. A tumor will be evident with destruction of the vertebral bodies and change of alignment and fracture will be determined by plain x-ray with change in alignment and bone disruption.

The MRI is the best test to show soft tissue masses associated with metastatic cancer as well as marrow changes with cancer or infection. The MRI is the best test for vertebral Osteomyelitis.

A relative indication for an MRI is unrelenting neck pain without neurologic deficit with degenerative changes seen on x-ray, and symptoms for six months. This would be not associated with fevers or chills or other systemic symptoms. Certain types of headaches can be caused by upper cervical level disc disease that can sometimes be seen on the MRI.

SHOULDER

In general, MRI is the best test for diagnosing tumors, soft tissue lesions, impingement syndrome, rotator cuff tendonitis or partial tears, articular cartilage lesion or labril lesions.

But is MRI needed for diagnosis of these problems?

1. Impingement syndrome, rotator cuff tendonitis, or rotator cuff tears are diagnosed by impingement test and clinical exam. The treatment of all three is based on conservative care, not whether rotator cuff tear is present (except in acute large rotator cuff tears where arthrogram is equally effective).
2. In cartilage lesions and labril lesions MRI sometimes is helpful; however, it affects treatment very little as most of these patients go on to arthroscopy if their symptoms persist.

Indications for MRI of the shoulder:

1. For diagnosing tumors, infections, metabolic bone disorders or pathology in adjacent soft tissues.
2. For needle phobic patients who cannot tolerate an arthrogram.

Indications for arthrogram of the shoulder:

1. The two uses of arthrogram in the shoulder are to R/O frozen shoulder and R/O rotator cuff tears.
2. For the frozen shoulder the MRI is not generally helpful. The arthrogram shows small joint space, i.e. less than 14 ccs. But, most importantly, frozen shoulder is a clinical diagnosis and does not need any specific diagnostic tests.
3. The arthrogram is diagnostic of acute full thickness rotator cuff tears more so than MRI. Acute, full thickness rotator cuff tears are the only ones that need diagnostic studies as they are the only ones that need surgical treatment acutely. The remainder of the rotator cuff tears, i.e. smaller or incomplete tears are treated based on non-responsiveness to conservative care.

KNEE

Indications for MRI of the knee:

1. To rule out tumors of infections.
2. In selected patients to avoid surgical intervention if a low probability of a surgical lesion is present, but the patient is not responding to conservative treatment.
3. A "committed" athlete in mid-season.
4. In certain pediatric patients who sustain ligament injuries, to determine if early repair would be needed.

ELBOW

In general, MRI rarely is indicated for elbow problems. X-rays and CT scan are used to evaluate bony problems, e.g. osteophytes, loose bodies, etc.

Indications for MRIs of elbow:

1. R/O tumors, infection, avascular necrosis, osteochondritis dissecans, and certain metabolic bone diseases.

WRIST

Indications for MRIs of the wrist:

1. R/O tumors, infection, avascular necrosis and certain metabolic disorders.
2. Rare indications to evaluate various ligamentous and cartilage lesions in acute settings may be indicated in chronic wrist pain and/or mechanical symptoms that have failed prolonged conservative treatment. An arthrogram or an arthroscopy may be the appropriate alternate diagnostic study for these problems.

ANKLE

Indications for MRIs of the ankle:

1. R/O tumor, infection, avascular necrosis and certain metabolic bone disorders.
2. R/O osteochondritis dissecans or pseudomeniscus in the post ankle sprain patient with chronic pain.